

# SENG2021

## Deliverable Four&Five

*Team: int elligence;*



### Team Members

Joel Huang (z5309467), Rifa Jamal (z5311190), Eeman Chaudhry (z5309333),  
Sophia Chen (z5312941), Rohan Warrier (z5312909), Rovielyn Espiritu (z5259266)

# Table of Contents

<b>Table of Contents</b>	<b>2</b>
<b>Introduction &amp; Scope</b>	<b>3</b>
Problem Statement	3
<b>Requirements Analysis</b>	<b>3</b>
System Features	3
User Stories	4
Interface Screenshots	5
Homepage	5
Adding Ingredients	6
Adding Filters	7
Sorting Option	8
Recipe Results Page	9
Pagination	10
Displaying Recipe Information	11
<b>Design Analysis</b>	<b>12</b>
Final Design Changes	12
Final Software Architecture	13
Sequence Diagrams	14
Key Technologies	16
Web Application Stack Diagram	16
Key Benefits/Achievements of Design/Implementation	17
SWOT Analysis of our Design/Implementation	18
<b>Team organization and conclusion</b>	<b>19</b>
Roles and Responsibilities	19
SWOT Analysis:	23
Improvements	24

## Introduction & Scope

Finding recipes online can be troublesome as recipes usually contain ingredients which may not be easily available, or often require ingredients or nutrients that are not suitable for their dietary requirements. Our purpose is to cater to users' needs by giving recipes based on their preferences and available resources. By making recipe searching easier for users, int elligence; also aims to promote home-cooked meals and encourage users to produce less food wastage.

### Problem Statement

- People have ingredients at home that they do not know how to utilise in a meal plan
- Recipes found online often contain ingredients which may not be easily available or need to be bought.
- Current recipe searching websites based on given ingredients are hard to navigate due to a cluttered and non-intuitive interface.
- Current recipe searching websites lack extensive filters to refine the recipes such as time range and nutritional requirements.

## Requirements Analysis

### System Features

Our system has the following features:

- **Selecting ingredients**

Users can type the names of the ingredients they have at home and add it to a list of ingredients which will be included in the recipes displayed to the user.

The user will also have the option to do a negative search, choosing the ingredients that they don't want to be included in the recipe.

- **Filter Recipes**

Users can filter the recipes displayed to them via:

- Dietary Requirements (e.g. Dairy Free, Gluten Free, Vegan)
- Nutritional Requirements (e.g. Low-Sodium, High-Protein)
- Cuisine (e.g. Mexican, Thai)
- Dish Type (e.g. Starter, Dessert)
- Time Range: Maximum prep time for a meal
- Negative Search: excluded ingredients

- **Sorting Results**

Users have the option to sort the displayed recipes by:

- Least number of missing ingredients
- Alphabetical order
- Shortest to longest cooking time
- Longest to shortest cooking time
- Lowest to highest calories

- **Viewing Recipe Information**

Users are able to view more information about a recipe including:

- Allergens
- Ingredients and measurements
- Nutritional information
- Source url

## User Stories

**Feature: Search for recipes with specific ingredients**

**As a person who wants to search for recipes using a subset of ingredients**

**So that I can find recipes tailored to my selection**

**I want to be able to add ingredients I want and remove ingredients that I don't want**

**GIVEN** I am on the HomeCooks home page

**WHEN** I click on 'Add an ingredient' button

**THEN** I should be able to add ingredients which I want included by typing them

**THEN** after I click on 'add filters' button

**AND** navigate to 'Negative Search'

**THEN** I should be able to type ingredients which I do not want included

**WHEN** I click on 'Find recipes' button

**THEN** I should see a list of recipes which contain most (if not all) of my selected ingredients

**WHERE** none of the recipes include any ingredients in the 'Negative Search' list

**Feature: Sort recipes**

**As a person who wants to organise the recipe results**

**So that I can find recipes with a certain feature easily**

**I want to filter the suggested recipes by my chosen grouping**

**GIVEN** I am on the HomeCooks 'Recipe List' page

**WHEN** I click on the 'sort by' button

**AND** select a grouping option

**THEN** the webpage would display recipes in the selected order

**Feature: Filter recipes based on selected requirements**

As a person who has specific meal requirements

So that I can only view recipes that I would be interested in cooking

I want to filter recipes based on my given constraints

**GIVEN** I am on the HomeCooks homepage

**WHEN** I click on the ‘select filters’ button

**THEN** I should be able to choose my desired filters

**WHEN** I select my filters and click the ‘search’ button

**THEN** the webpage will only display recipes that satisfy my selected requirements

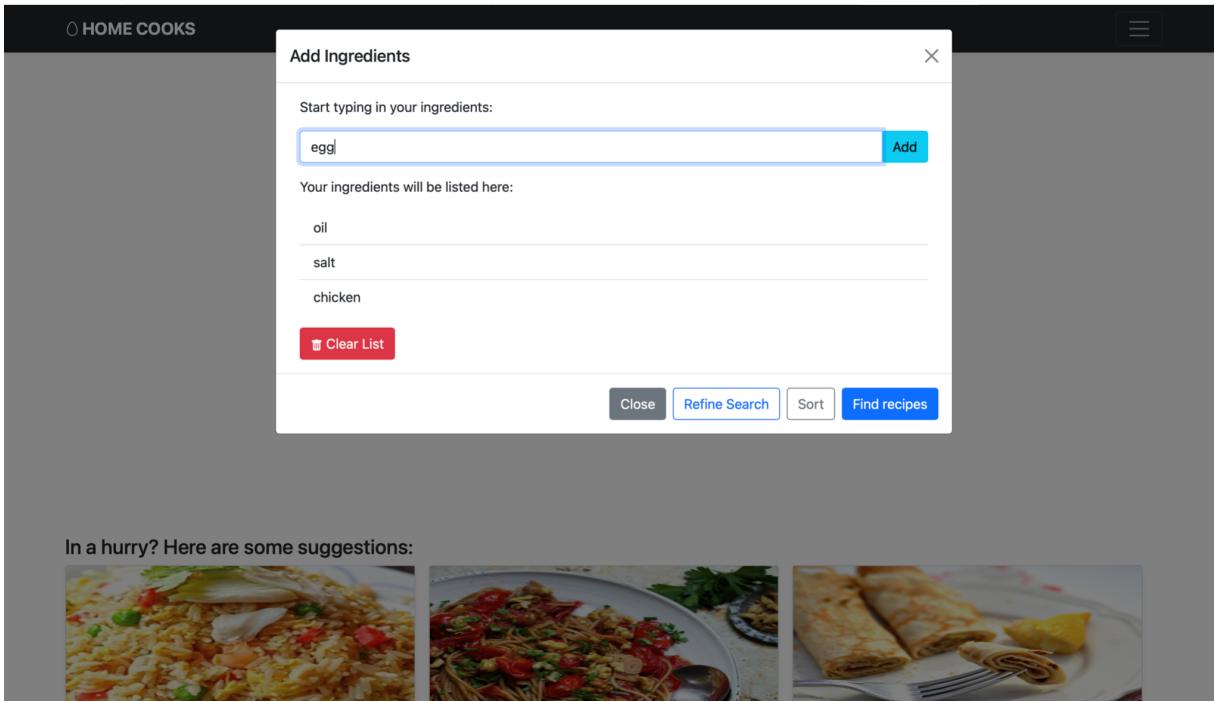
## Interface Screenshots

### Homepage

The screenshot shows the homepage of the HomeCooks website. At the top, there is a dark header bar with the text "HOME COOKS" and a menu icon. Below the header, the main content area features a large heading "Welcome to our landing page". Underneath the heading, there is a brief introduction: "HomeCooks is presented by "int elligence;" from UNSW SENG2021 2021 T1." It also includes instructions: "To get started on finding a dish for you, click on Choose your ingredients to add the ingredients you want in your recipe." and "Click on Refine search, if you want dishes better suited to your needs." At the bottom of the main content area, there are two blue rectangular buttons: "Choose your ingredients" and "Refine search". Below these buttons, there is a section titled "In a hurry? Here are some suggestions:" followed by three images of different meals: a fried rice dish, a pasta dish with tomatoes and herbs, and a rolled omelette.

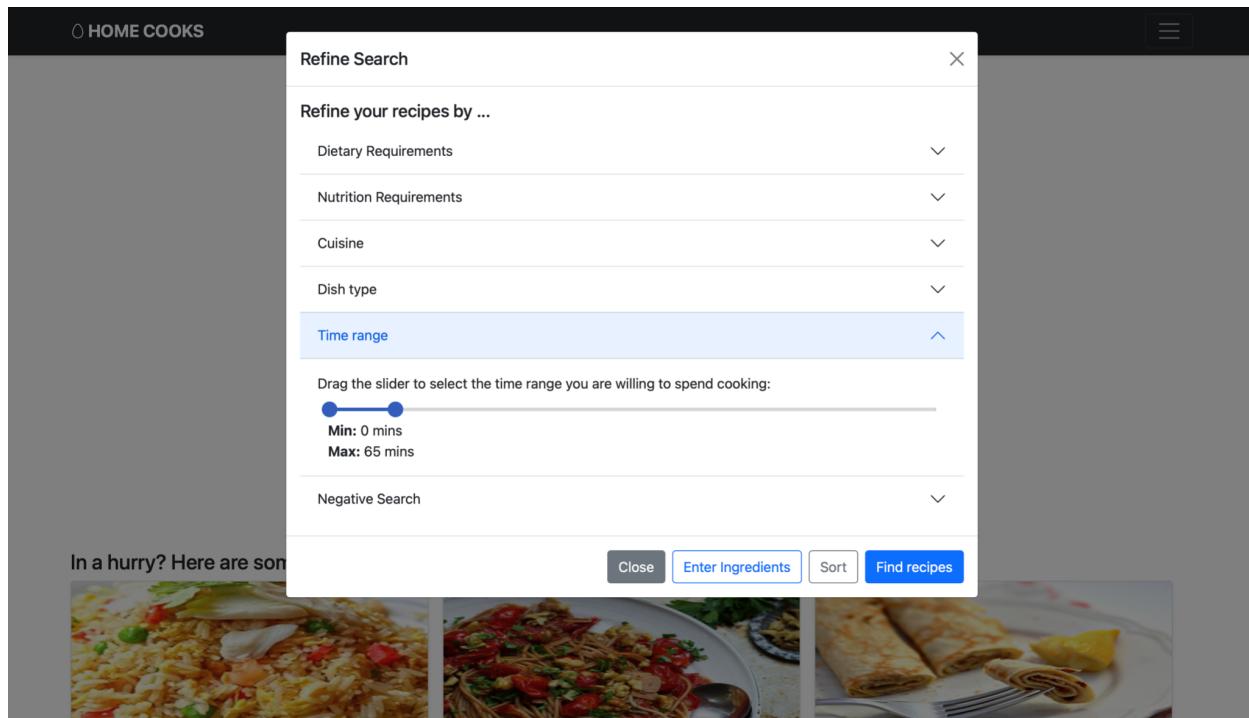
**Figure 1:** A screenshot of the Index/Home Page of the HomeCooks website. This page gives users a brief overview of the website and how to use it as well as having buttons to choose ingredients and filters.

## Adding Ingredients



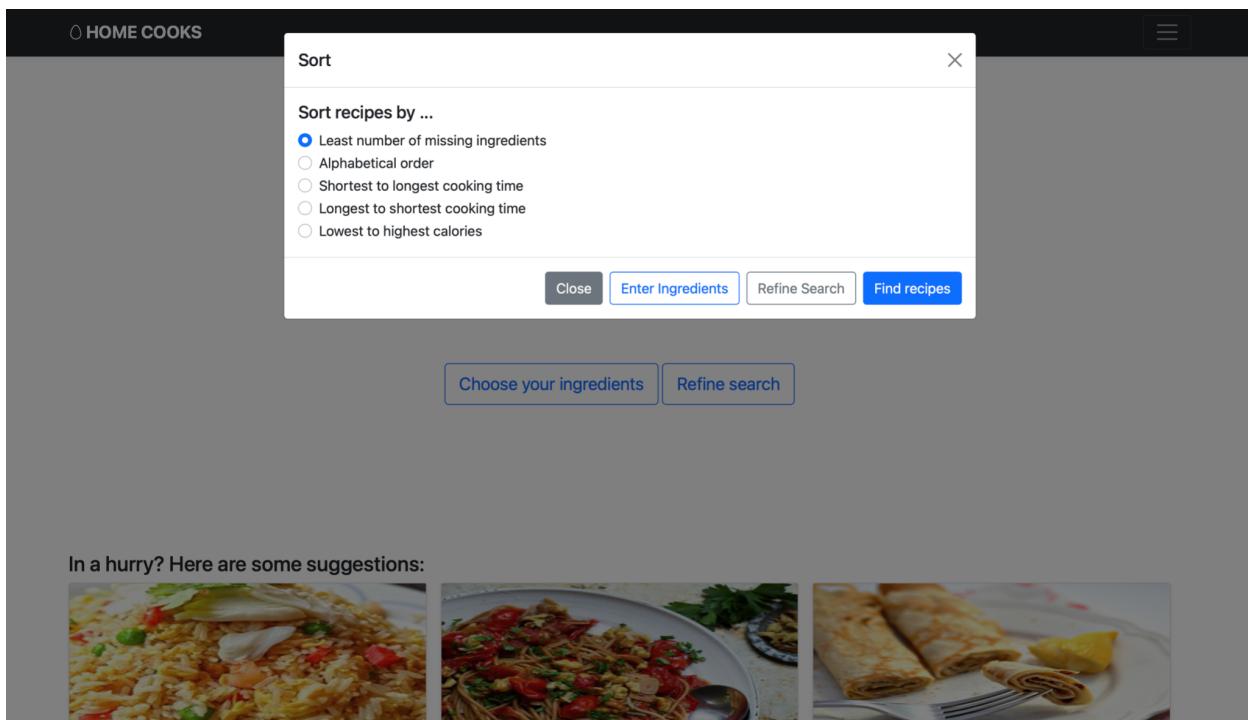
**Figure 2:** Pop-up modal displayed when ‘Choose your ingredients’ button is clicked on the homepage. Here, users are able to type in their chosen ingredients and click “add” to include it.

## Adding Filters



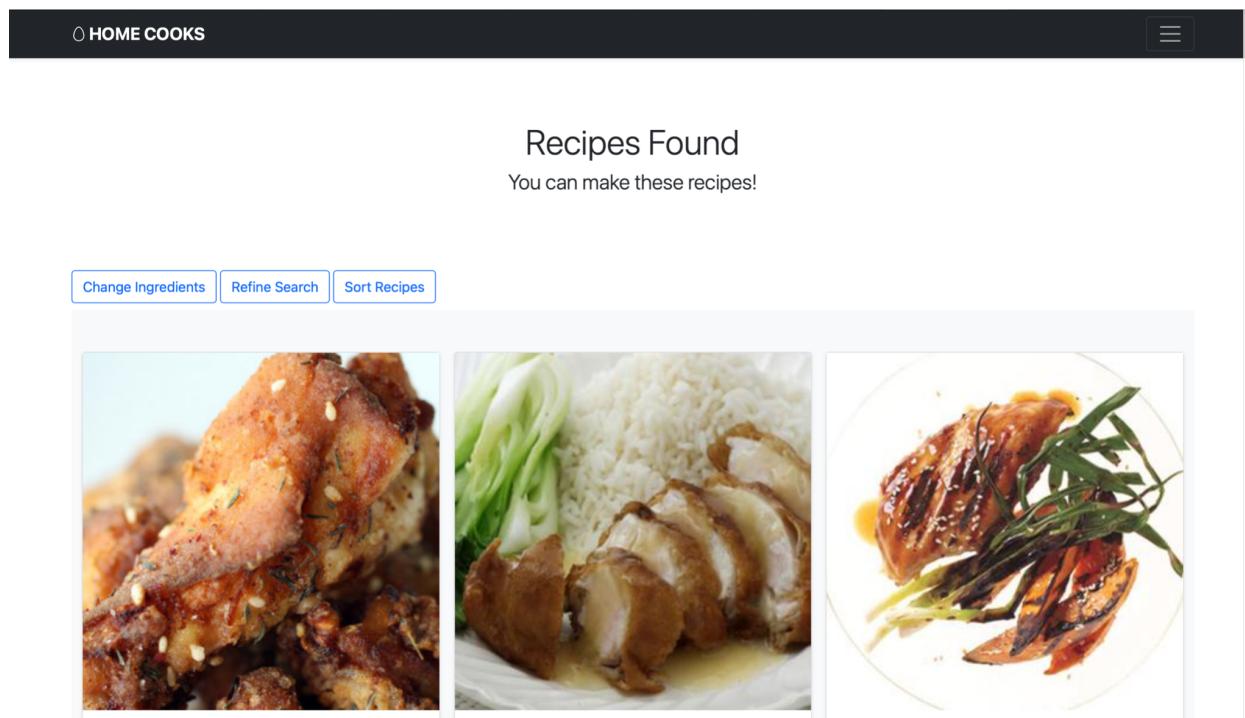
**Figure 3:** The above screenshot displays the pop up modal box that appears once the 'Refine Search' Button has been selected. Users are then prompted to multiple different filter options they can choose from.

## Sorting Option



**Figure 4:** Screenshot shows pop-up modal displayed when 'Sort' button is clicked from another button clicked on from the homepage. Users can sort their selection by various criteria.

## Recipe Results Page



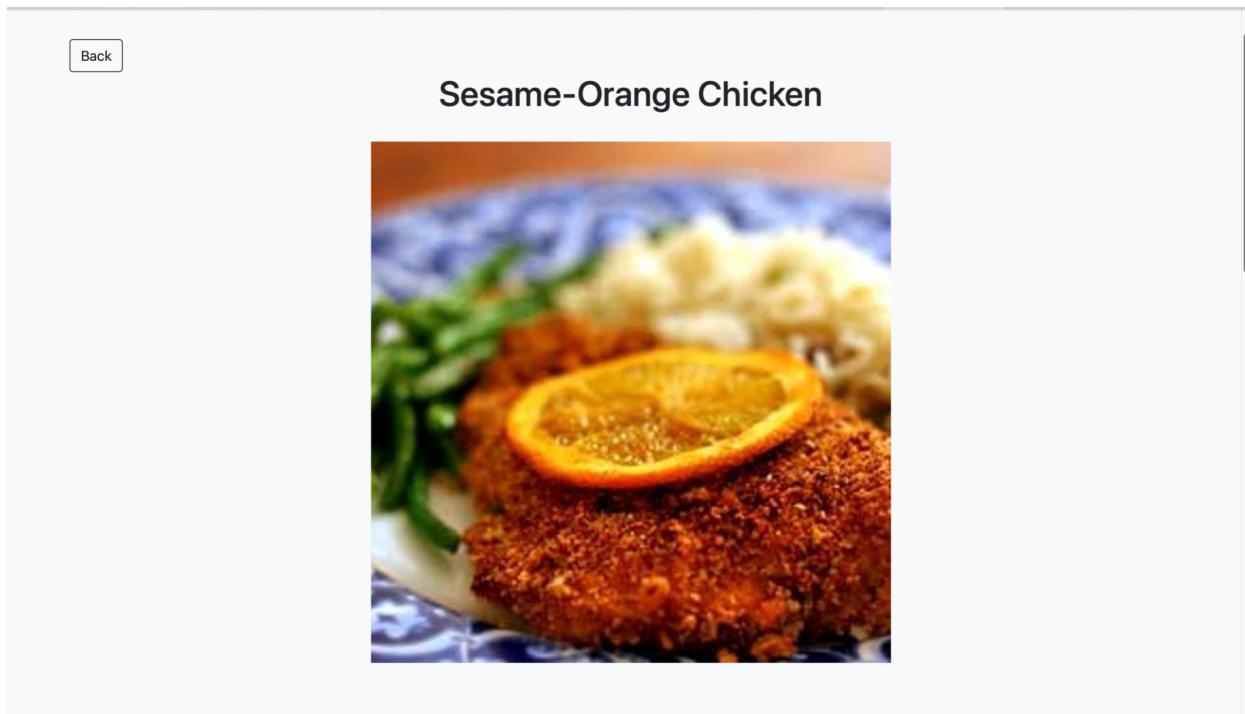
**Figure 5:** Screenshot shows the results page displayed when the user clicks 'Find recipes'. It displays recipes to match their search.

## Pagination

Cooking time: 25 mins Total calories: 2943.86 kcal	Missing ingredients: 7 Cooking time: 25 mins Total calories: 1699.46 kcal	Cooking time: 27 mins Total calories: 3600.9 kcal
		
<b>Middle Eastern-Style Chicken, Veggies and Rice</b> Missing ingredients: 7 Cooking time: 30 mins Total calories: 4869.69 kcal	<b>Asian-Style Chicken and Rice</b> Missing ingredients: 8 Cooking time: 50 mins Total calories: 2405.14 kcal	<b>Chicken Potstickers</b> Missing ingredients: 8 Cooking time: 25 mins Total calories: 2612.91 kcal
<p style="text-align: right;">1 2 3 4 5</p>		

**Figure 6:** The results page shows up to five pages of relevant recipes. Users can navigate to a specific page of results.

## Displaying Recipe Information



**Figure 7:** The above screenshot shows that the display recipe page looks like once a recipe is chosen. An image of the recipe is displayed.

A screenshot of a detailed recipe display page. At the top, there are two columns of dietary filters: "Egg-Free", "Tree-Nut-Free", "Fish-Free", "Shellfish-Free", "Pork-Free" on the left, and "Celery-Free", "Mustard-Free", "Lupine-Free", "Mollusk-Free", "Alcohol-Free" on the right. Below this, the "Ingredients" section lists the following items with checkboxes:

- 4 small boneless, skinless chicken breast halves (6 to 7 oz. each)
- 1 navel orange
- 1/2 cup orange marmalade
- 2 Tbsp soy sauce
- 1 Tbsp grapeseed oil or peanut oil
- 1 teaspoon Asian sesame oil
- 1 teaspoon red pepper flakes
- 1/2 teaspoon Kosher salt
- 1 cup breadcrumbs
- 2 Tbsp butter, melted
- 1/2 cup sesame seeds

The "Procedure" section is partially visible on the right, with the first line being "To learn how to cook this recipe, click [here!](#)".

**Figure 8:** The above screenshot shows that the display recipe page looks like in regards to the dietary requirements and ingredients. A link to the recipe website is provided.

Nutrients per serving			
<i>Calories per serving: 2568.95</i>			
<b>Energy</b>	2568.95 kcal	<b>Zinc</b>	12.65 mg
<b>Fat</b>	102.37 g	<b>Phosphorus</b>	2300.84 mg
<b>Saturated</b>	27.04 g	<b>Vitamin A</b>	277.66 µg
<b>Trans</b>	0.98 g	<b>Vitamin C</b>	90.66 mg
<b>Monounsaturated</b>	29.71 g	<b>Thiamin (B1)</b>	2.42 mg
<b>Polyunsaturated</b>	33.43 g	<b>Riboflavin (B2)</b>	2.1 mg
<b>Carbs</b>	220.39 g	<b>Niacin (B3)</b>	82.64 mg
<b>Fiber</b>	18.03 g	<b>Vitamin B6</b>	6.87 mg
<b>Sugars</b>	115.27 g	<b>Folate equivalent (total)</b>	381.02 µg
<b>Sugars, added</b>	96.0 g	<b>Folate (food)</b>	230.9 µg
<b>Protein</b>	197.71 g	<b>Folic acid</b>	88.56 µg
<b>Cholesterol</b>	599.13 mg	<b>Vitamin B12</b>	1.97 µg
<b>Sodium</b>	3014.66 mg	<b>Vitamin D</b>	0.43 µg
<b>Calcium</b>	1075.24 mg	<b>Vitamin E</b>	9.36 mg
<b>Magnesium</b>	549.07 mg	<b>Vitamin K</b>	12.04 µg
<b>Potassium</b>	3462.55 mg	<b>Water</b>	756.51 g

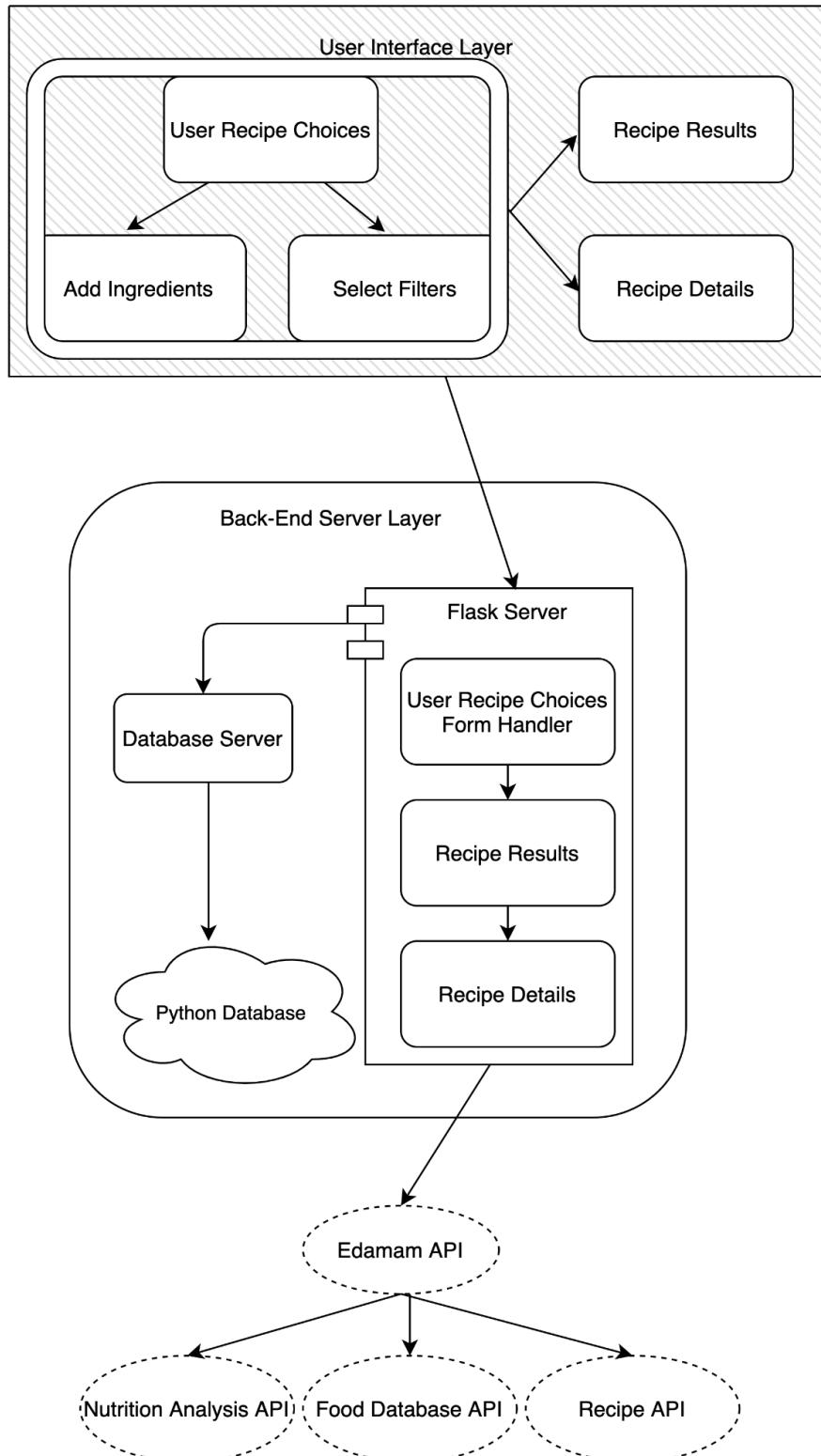
**Figure 9:** Nutritional Analysis of Recipe Displayed

## Design Analysis

### Final Design Changes

Based on the feedback from our mentor, our Deliverable 1 prototype, and Deliverable 3 website presentation offered the group a chance to change some things related to the design of our website. Upon revisal of some of the user stories, the final design vision was clear thus allowing us to know what we were creating from start to finish.

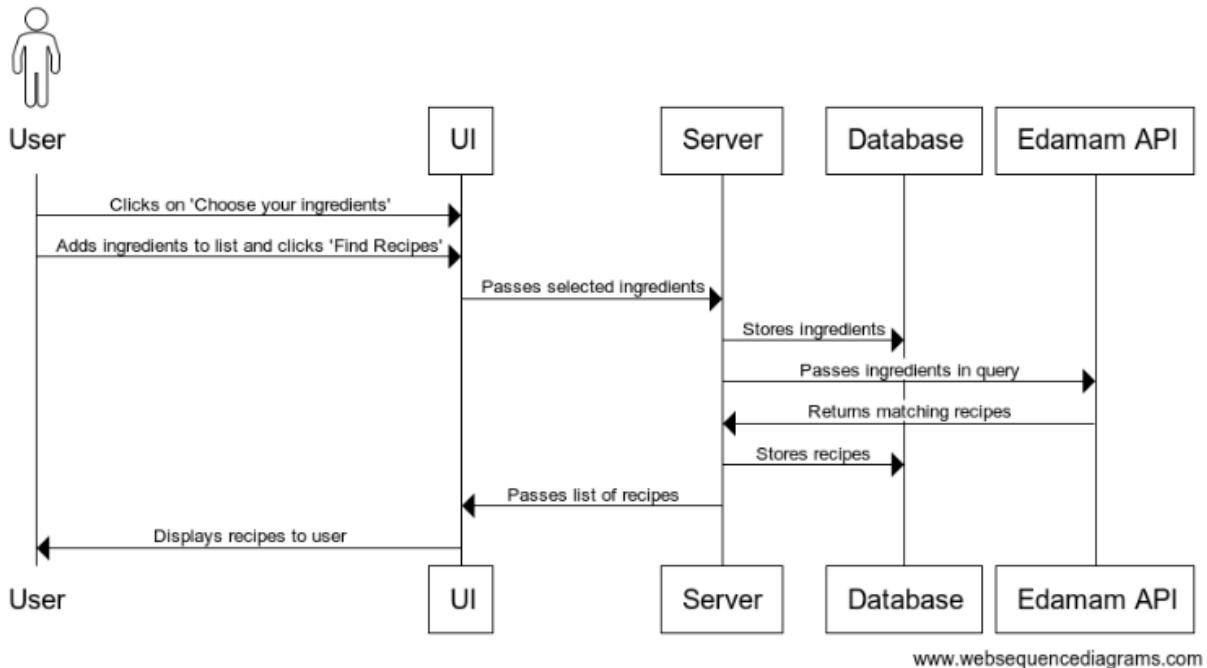
Our Deliverable 3 feedback addressed a lot more design issues, such as the button sizing, style and wording. Upon taking this feedback on board, the buttons were further refined on the landing page and results page. Final design features, such as pagination, were implemented to further refine the website aesthetics and usability.



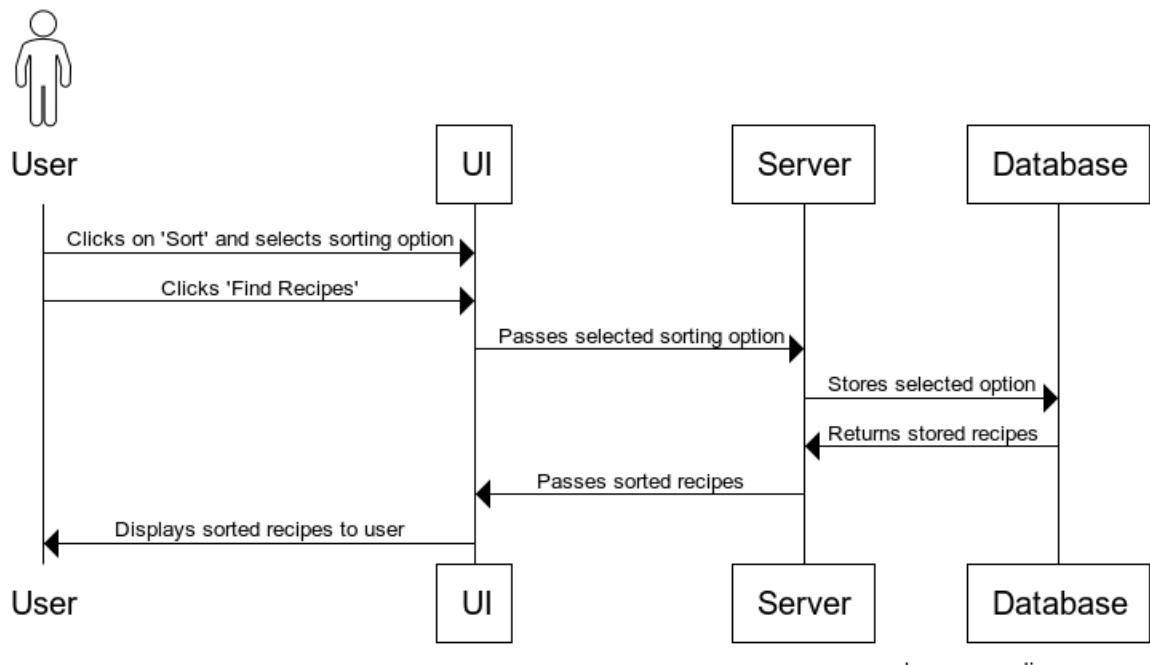
## Final Software Architecture

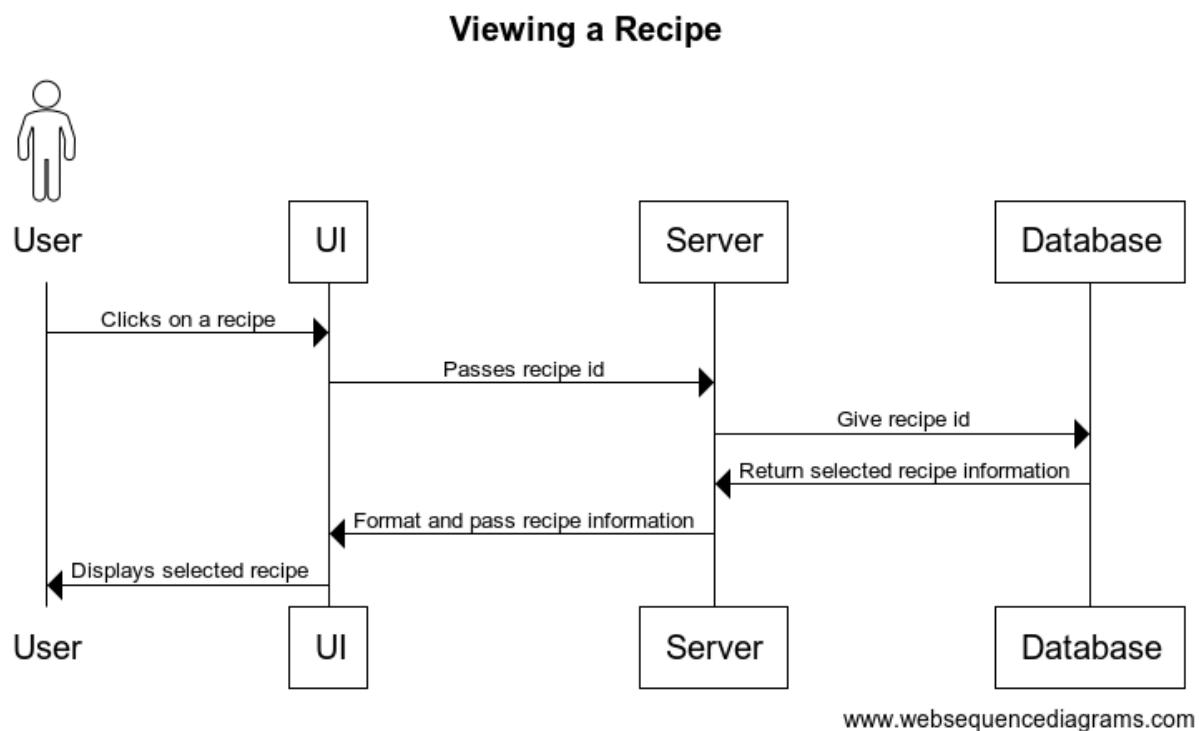
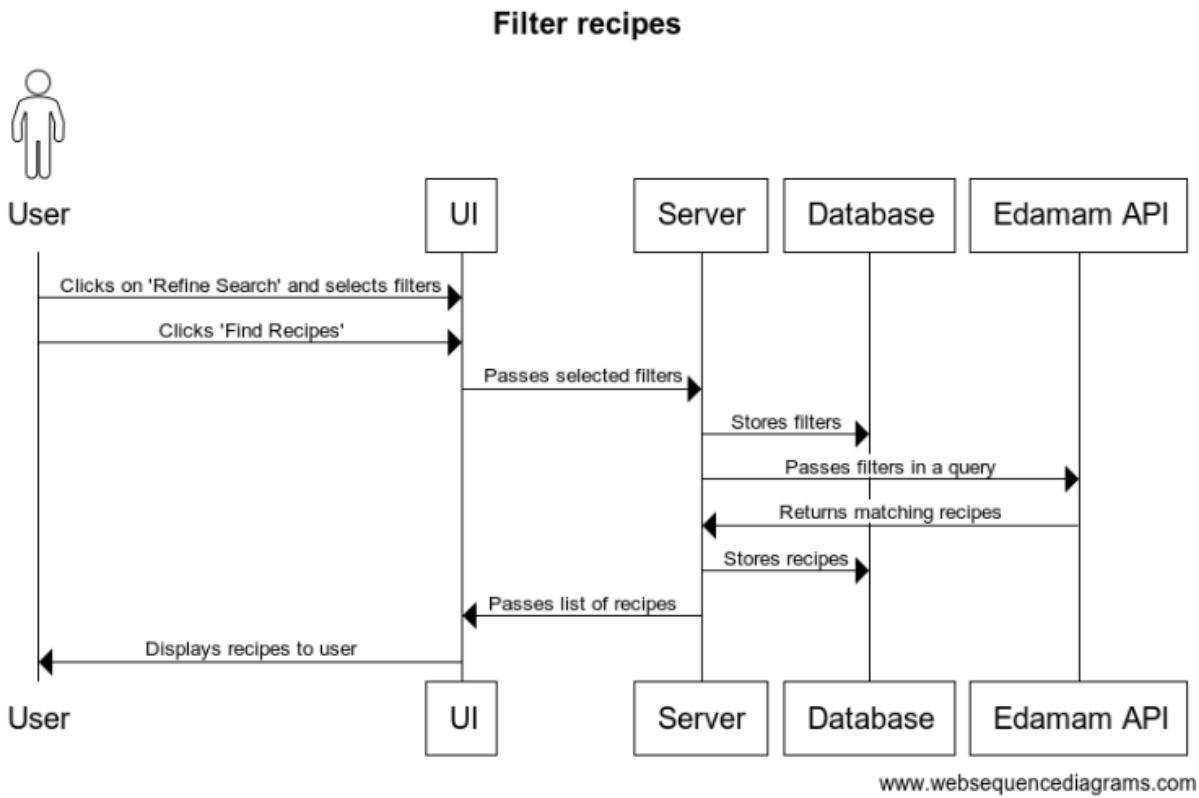
## Sequence Diagrams

### Find recipes with the added ingredients



### Sort recipes



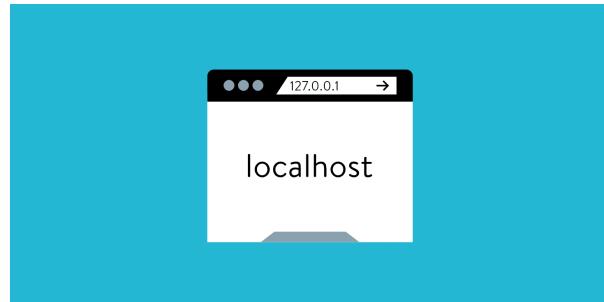


## Key Technologies

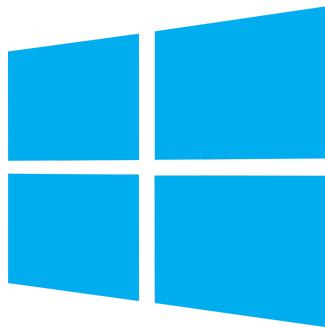
Web Application Stack Diagram



Deployment/ Local Hosting through Flask Server



Operating System



## Key Benefits/Achievements of Design/Implementation

The Edamam API provided all the data our website required, having extensive query searching that was able to return recipes based on a multitude of filters such as dietary requirements, time range, meal type and cuisine. The data format returned by the API was in JSON format which complemented our back-end components of Python and Flask. The simplicity of the Flask framework combined with our team's experience with the high level language Python, greatly reduced the learning curve when implementing our system. As our group is relatively new to using front-end technologies, we used a Bootstrap framework with HTML/CSS/Javascript for our front-end component as it is lightweight and has cross browser support. Since the framework is open source, it also provides many templates to choose from.

## SWOT Analysis of our Design/Implementation

S STRENGTHS	W WEAKNESSES
<ul style="list-style-type: none"> <li>• Adding any amount of ingredients of your choice</li> <li>• Negative search - removing ingredients</li> <li>• Wide range of filters to suit everyone's needs</li> <li>• Sorting option - makes it easier to find recipes based on preferences</li> </ul>	<ul style="list-style-type: none"> <li>• Cannot choose recipes based on level of difficulty to make it - the API does not provide this information</li> <li>• Cannot search recipe by the name</li> </ul>
O OPPORTUNITIES	T THREATS
<ul style="list-style-type: none"> <li>• Combine the Edamam API with another one to get more features - such as level of difficulty of the recipe.</li> <li>• Implement a 'shopping list' so users can track ingredients.</li> <li>• Making and storing user account details in a database so their ingredients are saved</li> </ul>	<ul style="list-style-type: none"> <li>• Edamam API is currently using a free version, which stifles full testing since usage cannot go above a certain threshold.</li> </ul>

Our design features options of selecting ingredients and filters to find recipes based on a user's requirements. A strength that resonates with our website's goal of finding effortless recipes is that we have the option to display recipes in order of least missing ingredients (default setting). This means that after users enter their ingredients, they can save a lot of time using this default sort option by not having to waste time navigating recipes across all pages to see what ingredients they are missing.

An improvement our design could have is implementing suggested options that pop up under the search bar when users are entering ingredients based on the characters the user has typed in.

Although we implemented a shopping list, this is not tracked. Hence to allow users to save what ingredients they have from the recipe list, another improvement could be to make the shopping list tracked for each user. This could be done through a login system. Having this option will also open up space for many other features such as saving recipes.

A threat to our website is the current usage of the free version of the Edamam API, which hinders us to maximise the features of our website. An example of this is not having a standard recipe search bar where users can search the recipe by its name. As this is a prominent feature in most other sites, the lack of having this may be a threat to our website.

# Team organization and conclusion

## Roles and Responsibilities

Roles	Description	Team Members
<b>Deliverable 1</b>		
Creating Initial Problem Statement	Our team first individually designed our own problem statements. Next, we each read and provided feedback on each other's problem statement in order to create a joined and refined problem statement	All
Setting up GitHub Repo and Edamam API keys	Using the format provided as part of SENG2021 Lectures and the Deliverable Specs, we created a GitHub repo under the name of our team. The Edamam API to be used was also set up early to understand the structure of the data format.	Joel
Identify and Describe User Stories	Our team first discussed the features our website would entail and then chose certain features each to write user stories about. After doing so, we each discussed the user stories collectively and refined them as a group	All
Low Fidelity Prototype: Storyboard Interaction Graphs	All team members worked across a shared diagram website which allowed us to draw parts of the diagram simultaneously. As we were working while in a group call, it made the process quite easy	All
UI Component Sketches	For our sequence diagram, members were assigned different features to work on whilst in a group call to constantly give and receive feedback from other members.	All
Combined UI Storyboard	After designing the storyboard graphs and UI Component sketches,	All

	as a group we discussed how we should layout the website and hence arrives with the combined graphs	
High-Fidelity Prototype: Homepage/Index Page design	The index page prototype was designed using a Bootstrap template with changes made to fit our design. This included a select filter and select ingredient button which allowed users input their requirements. It also included a navigation bar which had a little bit of information about the website and the team.	Rohan Rifa Joel
HIFI: Results Page Prototype	The results page prototype included features of displaying a dummy list of recipes as well as mirroring the add ingredient and selecting filter buttons from the index page.	Sophia Eeman
HIFI: Display Page	The display page prototype displayed a dummy recipe from the results page. It mirrored what our display page would look like, including a list of ingredients, allergens and nutritional information.	Rovielyn
HIFI: Setting up prototype link	After the High Fidelity prototype pages were up and running, a prototype link was set up through Github Pages.	Joel
<b>Deliverable 2</b>		
Software Architecture Questions	Questions related to software architecture and components	All
Initial Software Design Questions	Use cases, user stories and sequence diagrams	All
<b>Deliverable 3</b>		
<b>Part 1: Preparation for Web Demo</b>		
Flask Setup	Setting up our different .html files on a Python Flask server	Rohan
Enter ingredients javascript	Main javascript for adding ingredients and displaying them on a list. Later	Rohan

	on, the ability to remove ingredients from the list and adding ingredients by pressing the enter key, was added	
Frontend passing data to backend	Passing user input data to the backend for processing	Rohan
Main backend functionality	Processing data through the backend by processing the data received from the frontend and the API and returning the results back to the frontend	Sophia Rohan
Edamam API	Directly getting a list of relevant recipe information for processing in the backend	Sophia
Backend data on results page	Returning data from the backend back to the front end to display on the results page	Rohan Rifa Sophia
<b>Part 2: Web Demo</b>		
Web Demonstration	A team member would share their screen and demonstrate a basic understanding of how the website functions	Rohan
Business Idea and Requirements run-through	Team Members explored the theme, architectural decisions, and sequence diagrams for adding ingredients, selecting filters and sorting results	Rifa Eeman Sophia Rovielyn Joel
<b>Deliverable 4 &amp; 5</b>		
<b>Part 1: Final Website Prototype</b>		
Final Website Prototype: Pagination	Introduction of a way to access more results by accessing different pages	Rohan Sophia
Error handling	Added a way to prevent internal server errors for non-existent ingredients and bad filter combinations	Rohan
Quick suggestions	Implementation of the recipe suggestions displayed on the home page	Rovielyn

Saving user inputs	Saving user inputs so they can be directly modified from the results page	Rohan
Updating Sort By Feature	We added extra options to sort by such as 'sort by least number of missing ingredients' which was set as default, as well as other options such as by lowest calories, etc	Sophia Rifa
Updating UI Design of Results Page	Fixed add ingredients and refine search buttons on the results page to be similar to the index page.	Eeman
Updating Display Page	Displaying the information for the selected recipe by formatting the returned data from the Edamam API.	Rovielyn Sophia
<b>Part 2: Website Presentation</b>		
Final Demonstration	While one team member shares their screen, the entire team would go on to explain some key concepts and features about the operation of the website as a whole, including GUI. During the presentation, we would go on to discuss various scenarios of people with different needs and how the website caters for everyone.	All
<b>Part 3: Final Report</b>		
Final Report	A compilation of our team's progress throughout the term including documentation about our website	All

## SWOT Analysis:

S STRENGTHS	W WEAKNESSES
<ul style="list-style-type: none"> <li>• Working as a team to edit and refine work</li> <li>• Being an active listener and innovator</li> <li>• Having a goal-oriented plan</li> <li>• Equal distribution of work and responsibilities</li> <li>• Successfully using many engineering processes to arrive at a final problem statement and design.</li> </ul>	<ul style="list-style-type: none"> <li>• Team members have little experience with front-end programming and using HTML, CSS and Javascript</li> <li>• Lack of assigning roles and tasks</li> </ul>
O OPPORTUNITIES	T THREATS
<ul style="list-style-type: none"> <li>• We were able to use our weaknesses from previous deliverables to learn from it and implement more collaboration for the remaining work and presentations.</li> <li>• Many tools and technologies to bring the final product to the next level.</li> </ul>	<ul style="list-style-type: none"> <li>• As classes were online, a challenge was to organise meeting times when everyone was available.</li> </ul>

Through working as a team, we realised that while individual skills and personal responsibility are important for success, coming together as a team, discussing ideas and planning is the base of achieving a more successful product.

Our team worked efficiently both individually and together, allocating work fairly and taking initiative to complete tasks. As a team, we were cohesive in terms of reading over each other's drafts and refining each other's ideas. We further implemented roles such as being an active listener, innovator and goal director as part of the team setting.

Through Deliverable 1 and 2, we realised that concept and design planning is a crucial stage before working on the technical product. Our team successfully created a problem statement, user stories and low-fidelity story-boards which were useful to analyse all the features and functions. Performing this step also allowed us to develop a specific and detailed layout of our website, hence making the technical process much easier and progressive.

During the Deliverable 3 presentation, we were able to receive feedback such as improving the names of our feature buttons. Further, our mentor also provided feedback for Deliverables 1 and 2. This includes creating more specific and less redundant user stories. We were able to successfully use all our feedback to learn and further develop our website to be more successful.

A threat to our group was that most members had no prior knowledge with HTML, CSS and Javascript. However, we each self learned whilst also using Bootstrap templates to ease the process in overcoming our barrier. During Deliverable 3, as all members had knowledge with JSON/Flask and Python, we were able to implement the API and database into our website more easily.

Although all members were proactive and took initiative to work on the project, our team did not consistently assign roles and tasks to members during the deliverables. While this did not impact our work ethic, this may have caused confusion as to who was working on a certain task or file. To improve this, next time, we can clearly assign roles before beginning tasks.

## Improvements

If time permitted, we could have implemented more features in our website, such as:

- Trending recipes rather than suggestions on the landing page, which would require data analysis
- Ability to create an account to like and comment on recipes as well as store ingredients and past search results
- A shopping list feature
- Ability to view recipe difficulty level
- Auto-complete when typing ingredients
- Auto-check entered ingredients on every recipe display page

Due to our team's lack of front-end programming knowledge, the design of the website was significantly impacted which led to a very simple design. This design could have been improved to make it more aesthetic and user friendly to attract more aspiring HomeCooks to our website. Adding a login system would also improve the user interface of the website and allow users to save their details without having to manually enter them every time. In a system where users can like recipes, recipes with a higher frequency of likes would appear near the front of the search results which would greatly increase the interest of the user in those particular recipes.